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Hypercat : A Database for extragalactic astronomy

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Abstract. The Hypercat Database is developed at *Observatoire de Lyon* and is distributed on the WEB through different mirrors in Europe. The goal of Hypercat is to gather data necessary for studying the evolution of galaxies (dynamics and stellar contents) and particularly for providing a $z = 0$ reference for these studies.

1. Present content of Hypercat

Hypercat maintains catalogues of data collected in the literature or at the telescope, concerning the photometry, kinematics and spectrophotometry of galaxies. Some catalogues contain “global” properties as total magnitude and other spatially resolved data. They give basic data to study the scaling relations of galaxies, as for instance the Fundamental Plane, and contain all the information needed to make the necessary corrections and normalizations in order to compare measurements of galaxies at different redshifts. The catalogues of global properties are:

- *The catalogue of central velocity dispersions* (for galaxies and globular clusters) has been presented in a preliminary form in Prugniel & Simien 1996. The present version gives 5470 measurements published in 352 references for 2335 objects. Hypercat allows one to retrieve the published measurements as well as homogenized (ie. corrected for systematics effects between datasets) and aperture corrected data.
- *The catalogue of magnitudes and colours* (published in Prugniel & Heraudeau, 1998) presents the photometry of 7463 galaxies in the U to I bands. The global parameters, asymptotic magnitude, surface brightness, photometric type (ie. shape of the growth curve), colour and colour gradients were computed from circular aperture photometry.
- *The catalogue of Mg2 index* (published in Golev & Prugniel, 1998) have 3712 measurements for 1416 galaxies. Aperture corrections and homogenization are available.
- *The maximum velocity of rotation* is available for the stellar rotation of 720 galaxies (mostly early-type). They represents 1491 measurements taken in 224 dataset. A bibliographical catalogue of spatially resolved kinematics (Prugniel et al. 1998) indexes 6214 measurements for 2677 galaxies.

In addition, other parameters, like the recession velocity, galactic absorption or environment parameters, are automatically extracted from other databases and Hypercat provides procedures to compute derived parameters.

However, the present understanding of the scaling relations becomes limited by the quality of the parameterization restricted to these “global” values. For instance, in Prugniel et al. (1996) we have shown that a more detailed description, including rotation and non-homology of the structure, must be taken into account when studying the fundamental plane of early-type galaxies. For this reason, Hypercat has also embarked in the gathering and distribution of spatially resolved data such as *Multi-aperture photometry* for 20537 galaxies (222045 measurements), *Kinematic profiles* (ie. “rotation curve”, velocity dispersion profiles...) for 1761 galaxies (73520 measurements) and *Catalogue of line strength profiles* (currently under development).

An original aspect in the development of Hypercat is that the different catalogues are *separately maintained in different sites*. The database is automatically updated by procedures running over the network at time of low-traffic. At present, observatories participating to the project are: Capodimonte (Napoli), Sternberg (Moscow), Brera (Milano), University of Sofia and Lyon.

2. Current axes of development: The FITS archive and Data Mining

The distribution, over several astronomers, of the work to maintain this database makes the individual charge affordable and we can foresee that we will be able to continue this part of the project. In addition, as Hypercat becomes known in the community, people begin to send us their data in a form making them easy to implement.

The usual approach when new measurements are needed is to make new observations. This is justified when the past observations do not have the required quality, but archived observations offer in many cases a serious alternative *if* the data can be accessed easily and have a good enough description.

We started in 1998 the construction of a FITS archive in Hypercat (HFA) coupled to data-mining procedures aimed at distributing data at any desired stage of processing or even measurements. At present HFA contains 29366 FITS files (for 14631 galaxies) mainly from the our medium resolution spectra of galaxies (Golev et al 1998 for details) and ESO-LV survey (Lauberts et al. 1989).

In the near future, we will archive other datasets, and in particular we call for contributions from astronomers outside our group which may be interested to distribute their data through this channel.

References

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